SmartMaster™ 2015

BTE CORPORATION

USER MANUAL

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Introduction

SmartMaster™ (SM) documentation is divided into three parts:

1. User Manual
2. Administrator Manual
3. Technical Notes

Audience

User Manual – should be read by all SM users. It is intended for users who use SM for monitoring and control of their distribution system (such as electric power grid, a gas distribution system, a water distribution system, etc.), but are not involved in changing SM configuration.

Administrator Manual – is intended for users who are also able to set up and reconfigure SM so it better reflects the monitored distribution system.

Technical Notes – are intended for BTE engineering staff, they document SM internal workings and specifications.

SmartMaster™ Overview

SmartMaster™ consists of several parts:

- Services running on customer server
- User interface (UI) programs, the Viewers, running on workstation computers.
- Credentials configuration program, *User Id*
- Deployment programs
- BTE server resident components

Services

Services are SM components running on customer server machine. They are responsible for

- All database management
- Communications with devices integrated into monitored distribution system
- Running of all application algorithms
- Definition and enforcement of security
- Event logging, including alarms
- Dispatching of important event notices to designated users
- Execution and dispatching of reports to designated recipients

The following services are available in this version of the software:

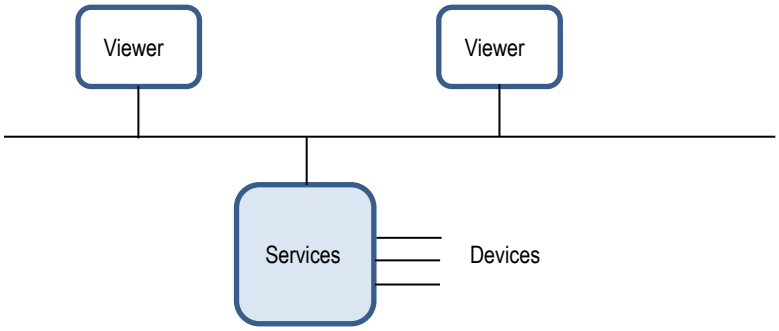
- *SmartMaster*™ – this is the top level service responsible for startup and shutdown of all other services and for performing other system-wide functions, such as periodic system backup, management of globally used tables, etc.
- *Communications* – responsible for management of all communications channels, including those for communications with remote devices, those for inter-service communications, and those for communications with user interface clients.

- *RemoteStations* – responsible for management of devices integrated into monitored distribution system, such as substation IEDs (voltage regulators, reclosers, etc.), RTUs, meters (electric, water, gas, etc.), switches, etc.
- *SystemUsers* – responsible for management of system user lists, user related security definitions, and assignment of important system event user notifications.
- *SCADA* – responsible for scheduling and execution of user authored algorithms, and management of one-line diagrams.
- *LoadManagement* – responsible for scheduling and execution of load management and demand response related algorithms.
- *CapacitorControl* – responsible for management of capacitor banks on the power grid.
- *MeterReading* – responsible for automated meter reading and invoicing activities.

Viewers

Viewers are user interface (UI) programs used by users to interact with SM. They can run on the server, or any of the workstations. They provide

- Real time screens for viewing of the various sections of database (such as system snapshots, event log views, data views, etc.)
- Commands to SM to execute various tasks (such as manually operate a remote switch, or back up the database)
- Screens for database configuration changes which modify SM behavior (such as change polling period, or modify analog input threshold values)
- Screens for writing of user authored programs
- Screens for graphical distribution system representation (one line diagrams)
- Screens for report definition, execution, and dispatching options



The following programs are available:

Main Viewer – this is the main UI program which integrates all other UI components. It opens up the top screen which shows customer name as well as the list of services running on the server. Users can open all other windows from here. All windows are updated in real time. Each window can be sized and positioned as desired. When re-opened, all previously opened windows return the same size and location as when they were closed. In addition, each window can be set to automatically open when the Main Viewer is opened.

Database Editor – is used for display and editing of database values. The values can also be printed out. In addition, this program is used to define which columns are shown in the various tabular displays. The program is fully integrated into the Main Viewer, but can also be opened independently as a stand-alone program.

Event Viewer – is used for real time display and management of system events and alarms. It provides tools for searching, sorting, printing and exporting of system events, as well as alarm acknowledgement commands. The program is fully integrated into the Main Viewer, but can also be opened independently as a stand-alone program.

Data Viewer – is used for real time data displays. It shows data in tabular and graphical forms in real time, and provides tools for sorting, filtering, exporting, and analysis of stored data, as well as real time data trending. The program is fully integrated into the Main Viewer, but can also be opened independently as a stand-alone program.

Report Manager – is a program for management of reports. Users can start Report Builder and create or modify reports. In addition, existing reports can be stored on report server in various user created folders. Folders can be assigned appropriate security. Report execution can be manually initiated, or scheduled for periodic execution. Subscriptions can be made so reports can be delivered via electronic mail in one of the various popular formats (html, PDF, Excel, etc.). The program is fully integrated into the Main Viewer, but can also be opened independently as a stand-alone program in a web browser.

Report Builder – is a program for building of reports. Users can define data sources, report layout, data rendering and displays of various forms (charts, plots, graphs, gauges, etc.). Users can save reports on any disk drive, or on report server. When saved on report server reports can be executed and dispatched automatically (see Report Manager above). This program can be started via Report Manager.

User Id

User Id is a program which identifies a user associated with specific Windows Account to SM. This program is run one time only so SM knows who is subsequently running the Viewers when logged on to a specific Windows user account, and assigns them appropriate security privileges.

Deployment Programs

There are two deployment programs:

Services Update – is responsible for updates of all service components on the server. This program is installed on the server only, and is manually executed when services need to be updated to the latest available version.

Viewers Update – is responsible for updates of all Viewers. This program is installed on the server and all workstations running the Viewers. It is manually executed when Viewers need to be updated to the latest available version.

BTE Resident Components

These are components running on BTE server, responsible for licensing, version deployment, and communications. They also host central one line diagram display element library.

User Interface

Listed below are properties common to all user interface windows.

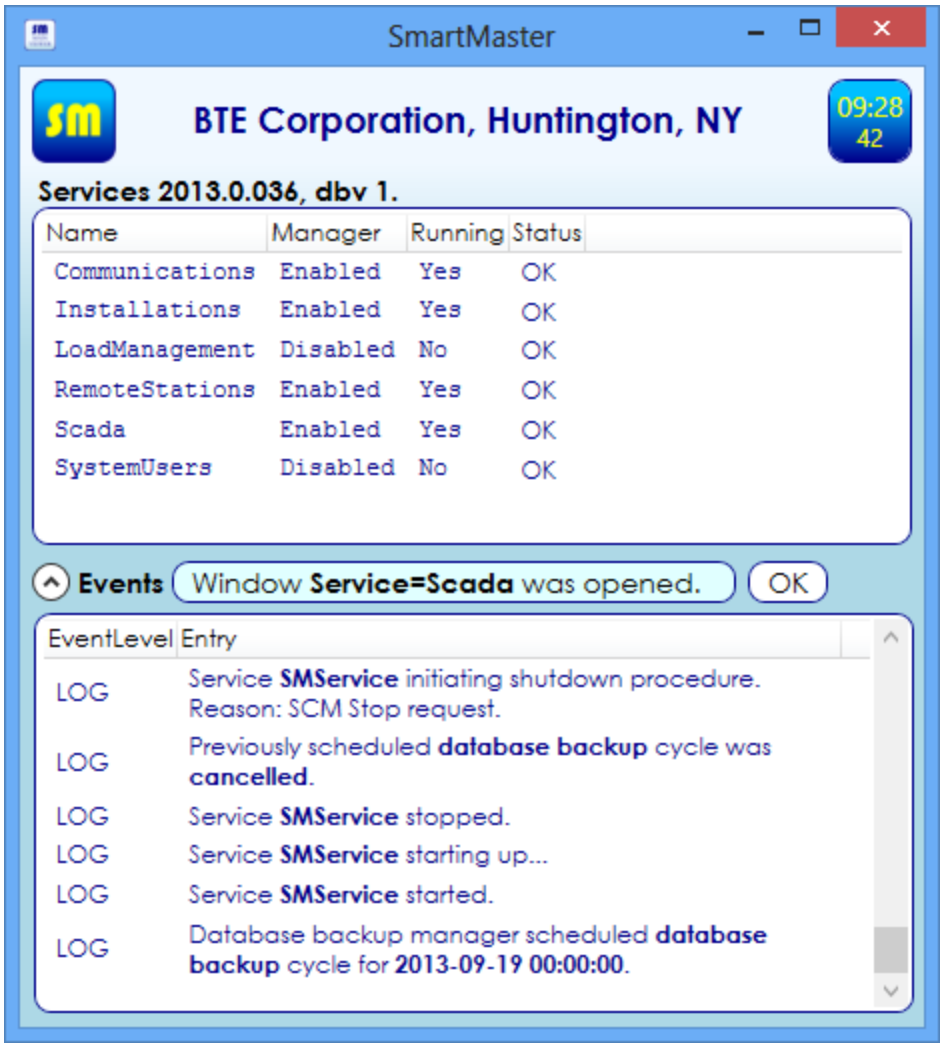
Startup and Shutdown

Viewers are started and terminated like any other Windows program. To start up a program simply double click onto the appropriate icon on Windows desktop, or select appropriate menu item in the Start section of Windows. Since SM security is fully integrated with Windows / Domain / SQL server, no additional action is required.

Viewers or individual windows are closed like any other windows, simply click on the 'X' button on top right of the window.

Window Structure

Viewer windows have a well-defined structure. Shown below is the top window which opens when Main Viewer is started.


SmartMaster
BTE Corporation, Huntington, NY
09:28
42
Services 2013.0.036, dbv 1.
Name Manager Running Status
Communications Enabled Yes OK
Installations Enabled Yes OK
LoadManagement Disabled No OK
RemoteStations Enabled Yes OK
Scada Enabled Yes OK
SystemUsers Disabled No OK
Events
Window Service=Scada was opened.
OK
EventLevel Entry
LOG Service SMService initiating shutdown procedure. Reason: SCM Stop request.
LOG Previously scheduled database backup cycle was cancelled.
LOG Service SMService stopped.
LOG Service SMService starting up...
LOG Service SMService started.
LOG Database backup manager scheduled database backup cycle for 2013-09-19 00:00:00.

Each window is associated with one of system objects (subsystems) being monitored. In above case the window is associated with SmartMaster™ service, the top service, as described in previous section.

The top part of the window shows SmartMaster™ *logo*, monitored *subsystem name* (in above example name of the company running SmartMaster™), and the *clock*. System licensing information is displayed when mouse cursor glides over the SM logo.

Below the top part of the window are white regions called *displays*. They are sub windows into subsystem being monitored, updated in real time. There can be one or several displays, depending on the open window. In above example there is one display showing a list of services installed on the server, and their status. The title of each display is shown at the top of the display, in black letters. In above example, the title shows the version of services running on the server (Services 2013.0.036), as well as version of the database running on the server (dbv 1). Displays can show tabular displays, graphical displays, selected web page, graphs, etc., all updated in real time, no matter where the user interface is with respect to the server (same room, or thousands of miles away on a machine with internet connection).

Below the display(s) are *Events* button, *Status Line*, and *Status Indicator*.

Status Indicator is displayed only in windows associated with services. It shows OK or ALARM(S), depending on whether or not there are alarms pending associated with that service.

Status Line (in above example showing 'Window Service=Scada was opened.') shows user interface events. It is the only part of the window where the UI reports what goes locally, not on the server.

The *Events* button shows or hides the abbreviated *Event Viewer* display below.

The *Event Viewer* display at the bottom of the window, when shown, lists events pertaining to the monitored subsystem only. The list is abbreviated to 100 latest events. Event Viewer display functionality is the same as that of the full Even Viewer. Please consult Event Viewer sections for details.

Commands

Commands are issued with the mouse. The technique to issue commands is straight forward and consistent across all UI windows. To issue a command targeting specific object (subsystem), proceed as follows:

- Point to the object and press the right mouse button.
- Select the desired command from the context menu, and click the left mouse button.

To issue a command targeting the object whose window is already open, point the mouse to that window title. To issue a command targeting an object displayed in one of the window displays, point the mouse to that object.

Commands followed by three periods (...) are not executed immediately; they followed by at least one more prompt or a confirmation dialog.

There are two kinds of commands:

- Commands executed by UI. After command execution the Viewer confirms command execution in the status line of the window where command was submitted.
- Commands executed by the server. In this case the Viewer confirms submission of command to the server in the status line of the window from which command was submitted.

An example of command executed by UI is the *Open* command, which simply opens another window on the local machine.

An example of command executed by the server is an *Operate* command which operates a remote switch. The command is first submitted to the server which, in turn, sends an appropriate message via appropriate communications channel.

Navigation

To open a window associated with specific object, point to that object and execute the *Open* command. A new window associated with that object opens.

Configuration

To reconfigure an object, point to that object and execute *Configuration* command. Database Editor opens with that object parameters loaded. Please consult the *Database Editor* section for details on how to reconfigure system objects.

Self-Documentation

Commands are self-documented. When the mouse cursor is placed over a command, documentation about that command is displayed. In most cases that is all documentation that is needed to understand the meaning of the command. In exceptional cases where commands are more involved additional documentation is provided in this manual.

In tabular displays table columns (object properties or parameters) are also self-documented. When the mouse cursor is placed over a specific column, documentation about that column is displayed. In most cases that is all documentation that is needed to understand the meaning of the parameter. In exceptional cases where parameters are more involved additional documentation is provided in this manual.

Same documentation is provided in Database Editor where parameters are self-documented. When the mouse cursor is placed over a specific parameter, documentation about that parameter is displayed.

Searching

One can search for keywords or values in tabular displays. To search proceed as follows:

- Open the desired window
- Right-click in the tabular display of interest
- Select column to be searched
- Enter keyword or value to look for

The system responds by displaying only lines which contain sought for keyword or value.

To clear the search press *Esc* key – original full list is displayed once again.

Printing

Contents of most displays can be printed by right-clicking on the display, and selecting *Print...* command.

Main Viewer

Main Viewer is a gateway to all available user interface windows and displays. It integrates database editing, event viewing and data viewing into one program.

Startup and Shutdown

When the Main Viewer is started the top window (shown in the *Window Structure* section above) opens, as well as any default windows (see below). Windows can be individually closed as needed. When the top window is closed all windows opened via the Main Viewer are closed automatically.

You cannot shut down SmartMaster™ with any of the Viewers – your system administrator can do that using Windows Service Control Manager (SCM).

Default Open Windows

Users can define which windows open by default when the Main Viewer is opened. They can also set size and location of those windows. This is accomplished as follows:

- Open the Main Viewer
- Open another window which is to open by default
- Size and position that window
- Execute *Window at Startup…* → *Open at Startup* command on that window.
- Close the Main Viewer top window.

To remove a window from the 'default open windows' list proceed as follows:

- Open the Main Viewer. Default windows also open.
- Select the window of interest.
- Execute *Window at Startup…* → *Do NOT Open at Startup* command on that window.
- Close the Main Viewer top window.

Above settings are particular to (and stored on) the workstation hosting the Main Viewer. Each workstation can have its own settings independent of others.

Commands

Main Viewer top window hosts a handful of specific commands which affect the system globally.

Configuration

Like in most other windows this command starts Database Editor and loads parameters associated with related object – in this case SmartMaster™ service. One important parameters is DatabaseBackup, which enables system administrators to set up automatic system database backup schedule.

Backup Database…

This command initiates immediate system database backup cycle.

Holidays

This command opens the Holidays window which lists holidays that matter to functioning of the system. Some regularly scheduled functions may not want to be executed on certain days of the year. System administrators can enter those days into the database.

Reports

This command opens the Report Manager (see section below).

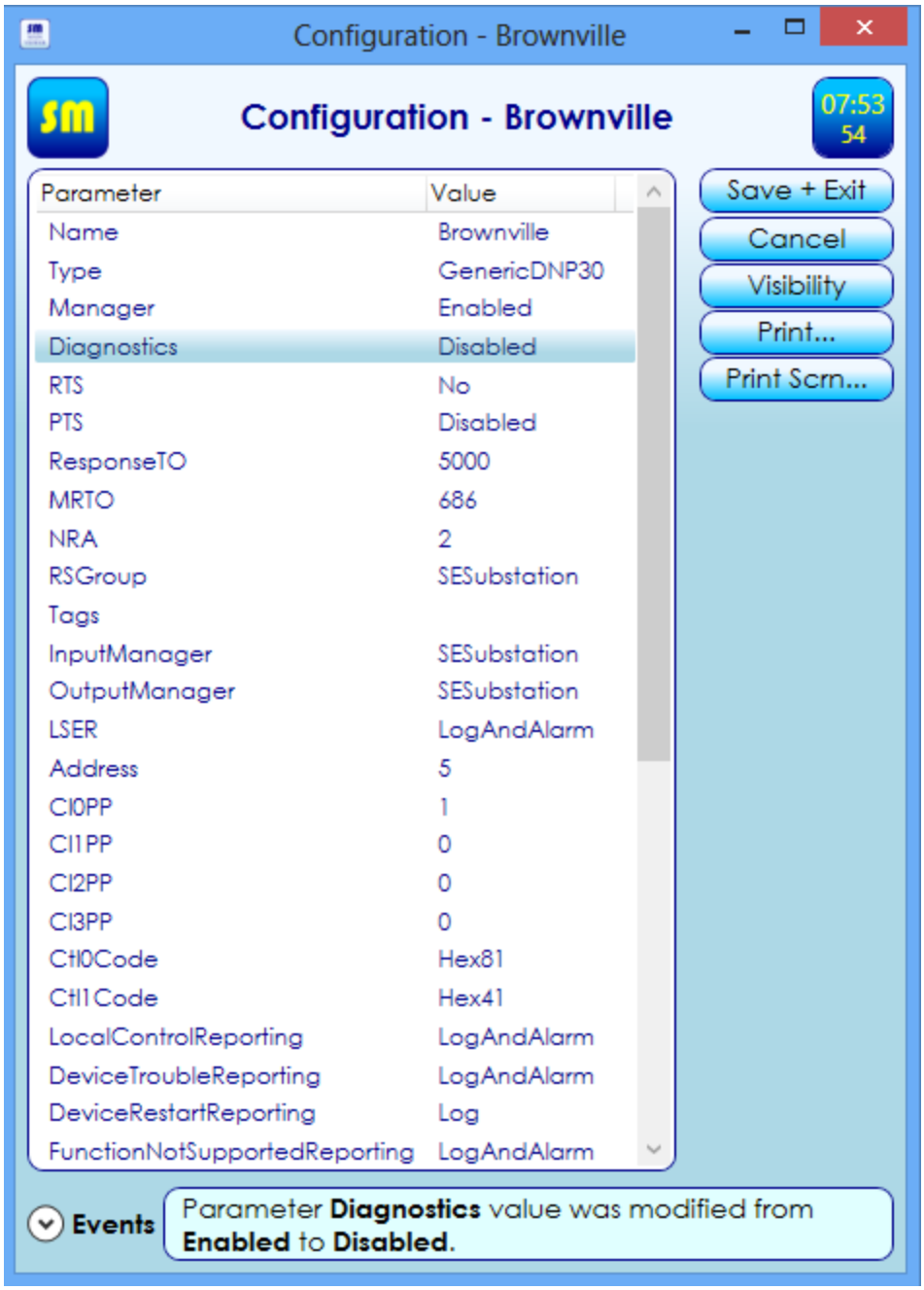
Alarm Audio...

This is a collection of commands for management of sounds associated with alarms. Execution of these commands is local to the host workstation running the Viewer. For example, when alarm audio is silenced, it is turned off on the local workstation only. The following commands are available:

- *Silence Alarm(s)* – silences alarm sounds until next new alarm transpires.
- *Enable Alarm Audio* – alarm sounds are permanently enabled on host machine.
- *Disable Alarm Audio* – alarm sounds are permanently disabled on host machine.
- *Persistent Alarm Audio* – makes alarm audio on host machine persistent (until silenced with *Silence Alarm(s)* command)
- *Non-Persistent Alarm Audio* – makes alarm audio on host machine non-persistent (one time only, at the time of new alarm)

Database Editor

SmartMaster™ properties (parameters) are recorded and maintained in SQL server tables. *Database Editor* is used for display and editing of those parameter values. The values can also be printed out. In addition, this program is used to define which columns are shown in the various tabular displays. The program is fully integrated into the Main Viewer, but can also be opened independently as a stand-alone program.



The program is fully integrated into the Main Viewer. When a user requests to view parameters associated with a specific system object, Main Viewer launches Database Editor and displays those parameters.

Database Editor can also be opened independently as a stand-alone program. When started independently the program lists the tables available for editing. After the user selects one of those tables, Database Editor displays parameters in that table.

Startup and Shutdown

To start the integrated Database Editor, right click on the system of interest and execute *Configuration* command. The full Database Editor starts, displaying parameters associated with that object.

To start the full Database Editor independently, click on the *Database Editor* icon on Windows desktop, or execute the *Database Editor* command in Windows *Start* menu. The full Database Editor starts by displaying database tables available for editing.

To close Database Editor and save changes of parameter values click on the *Save+Exit* button.

To close Database Editor without saving changes simply click on the *X* button at the top right of the Database Editor window, or click on the Cancel button in that window.

Edit Parameter Values

To edit parameter values proceed as follows:

- Open Database Editor (see above section)
- Click on parameter of interest
- Enter new parameter value
- Repeat for other parameters
- Click on the *Save+Exit* button to save changes

When the *Save+Exit* button is pressed Database Editor sends appropriate commands (one for each parameter value change) to the server. Every command is processed on the server individually; every parameter value change is saved and recorded in the event log.

Column Visibility in Tabular Displays

Database Editor can be used to select which columns are shown in tabular displays. To select visible columns proceed as follows:

1. Open the window of interest
2. Right-Click into the tabular display of interest
3. Select *Configuration* command
4. Click the *Visibility* button in Database Editor – the list of column names in selected display is shown
5. Toggle columns that are to be visible to *Yes*, others to *No*
6. Click on the *Save+Exit* button
7. Restart Main Viewer

Self-Documentation

In addition to general self-documentation mentioned in the User Interface section, Database Editor additionally self-documents every parameter listed in the display. When the mouse cursor is placed over specific parameter documentation about that parameter is displayed. In most cases that is all documentation that is needed to understand the meaning of the parameter. In exceptional cases where parameters are more involved additional documentation is provided in administrator manual.

Printing

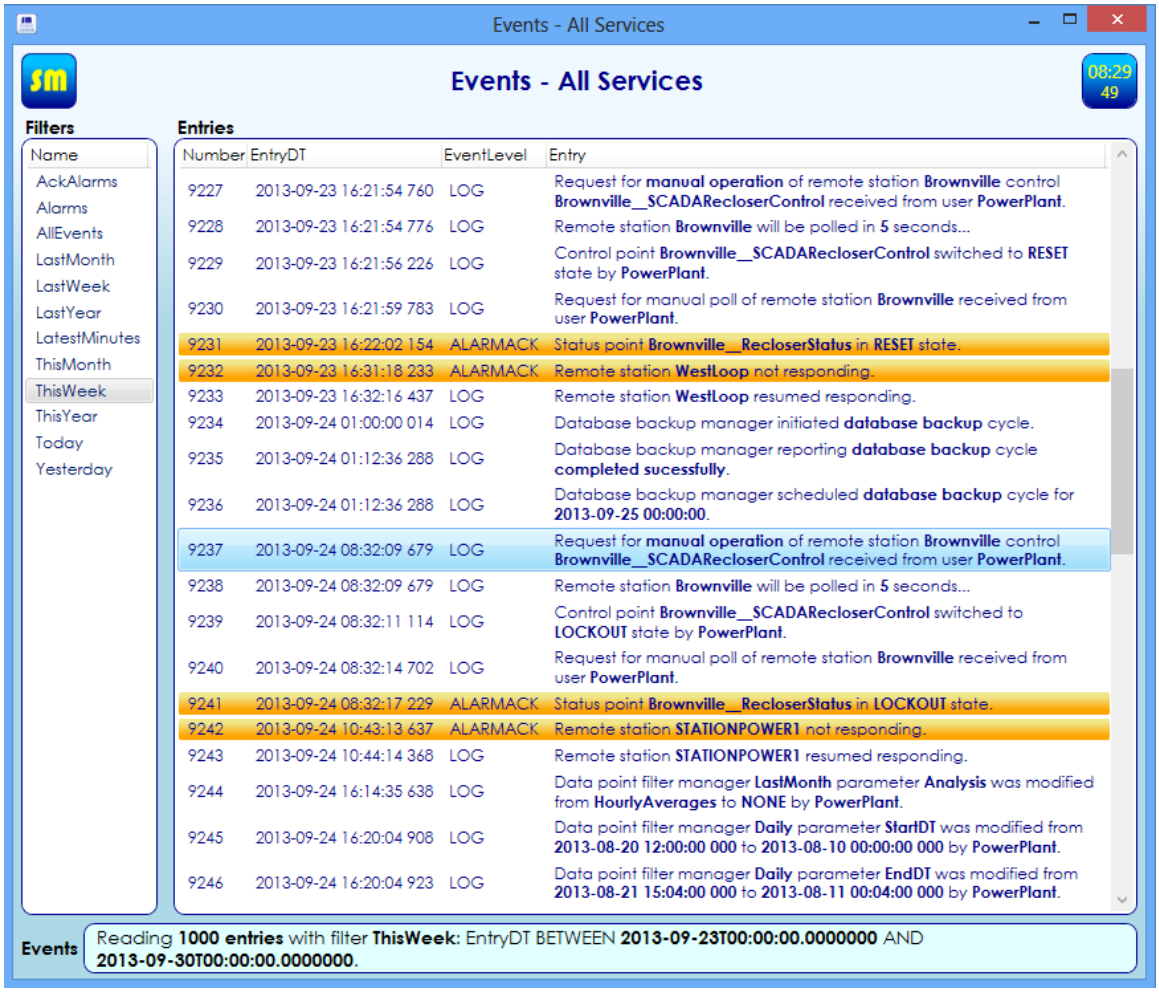
Contents loaded into Database Editor can be printed in two ways.

By clicking on the *Print...* button entire contents are printed out.

By clicking on the *Print Scrn...* button only the portion shown in display is printed.

Event Viewer

SmartMaster™ records all system events and alarms into a single database table. Event Viewer is SM component for real time display and management of those records. It provides tools for searching, sorting, printing and exporting of system events, as well as alarm acknowledgement commands.


Events - All Services
Events - All Services
08:29
49
Filters
Entries
Name
AckAlarms
Alarms
AllEvents
LastMonth
LastWeek
LastYear
LatestMinutes
ThisMonth
ThisWeek
ThisYear
Today
Yesterday
Number EntryDT EventLevel Entry
9227 2013-09-23 16:21:54 760 LOG Request for manual operation of remote station Brownville control Brownville__SCADARecloserControl received from user PowerPlant.
9228 2013-09-23 16:21:54 776 LOG Remote station Brownville will be polled in 5 seconds...
9229 2013-09-23 16:21:56 226 LOG Control point Brownville__SCADARecloserControl switched to RESET state by PowerPlant.
9230 2013-09-23 16:21:59 783 LOG Request for manual poll of remote station Brownville received from user PowerPlant.
9231 2013-09-23 16:22:02 154 ALARMACK Status point Brownville__RecloserStatus in RESET state.
9232 2013-09-23 16:31:18 233 ALARMACK Remote station WestLoop not responding.
9233 2013-09-23 16:32:16 437 LOG Remote station WestLoop resumed responding.
9234 2013-09-24 01:00:00 014 LOG Database backup manager initiated database backup cycle.
9235 2013-09-24 01:12:36 288 LOG Database backup manager reporting database backup cycle completed sucessfully.
9236 2013-09-24 01:12:36 288 LOG Database backup manager scheduled database backup cycle for 2013-09-25 00:00:00.
9237 2013-09-24 08:32:09 679 LOG Request for manual operation of remote station Brownville control Brownville__SCADARecloserControl received from user PowerPlant.
9238 2013-09-24 08:32:09 679 LOG Remote station Brownville will be polled in 5 seconds...
9239 2013-09-24 08:32:11 114 LOG Control point Brownville__SCADARecloserControl switched to LOCKOUT state by PowerPlant.
9240 2013-09-24 08:32:14 702 LOG Request for manual poll of remote station Brownville received from user PowerPlant.
9241 2013-09-24 08:32:17 229 ALARMACK Status point Brownville__RecloserStatus in LOCKOUT state.
9242 2013-09-24 10:43:13 637 ALARMACK Remote station STATIONPOWER1 not responding.
9243 2013-09-24 10:44:14 368 LOG Remote station STATIONPOWER1 resumed responding.
9244 2013-09-24 16:14:35 638 LOG Data point filter manager LastMonth parameter Analysis was modified from HourlyAverages to NONE by PowerPlant.
9245 2013-09-24 16:20:04 908 LOG Data point filter manager Daily parameter StartDT was modified from 2013-08-20 12:00:00 000 to 2013-08-10 00:00:00 000 by PowerPlant.
9246 2013-09-24 16:20:04 923 LOG Data point filter manager Daily parameter EndDT was modified from 2013-08-21 15:04:00 000 to 2013-08-11 00:04:00 000 by PowerPlant.
Events
Reading 1000 entries with filter ThisWeek: EntryDT BETWEEN 2013-09-23T00:00:00.0000000 AND 2013-09-30T00:00:00.0000000.

The program is fully integrated into the Main Viewer. When a user requests to view events associated with a specific system object, Main Viewer launches Event Viewer and displays the

latest 1000 or so (depending on default filter settings) event log records (and alarms) associated with that object.

Event Viewer can also be opened independently as a stand-alone program. In that case all events are displayed. By this it is meant that the latest 1000 or so (depending on default filter settings) records are displayed unfiltered.

An abbreviated version of Event Viewer is also built into the bottom of most every window. There about 100 latest events associated with monitored subsystem are displayed.

Startup and Shutdown

To start up the integrated window Event Viewer display, click on the *Events* button at the bottom of the window, just to the left of the status line.

To start the full integrated Event Viewer, right click on the object of interest and execute *Events* command. The full Events Viewer starts, displaying events associated with that system object.

To start the full Event Viewer independently, click on the *Event Viewer* icon on Windows desktop, or execute the *Event Viewer* command in Windows *Start* menu. The full Events Viewer starts, displaying unfiltered events associated with all system objects.

To shut down Event Viewer simply click on the *X* button at the top right of Event Viewer window.

To close the integrated Event Viewer at the bottom of any window, click on the *Events* button in that window. The Events button is a toggle; it opens and closes the integrated Events Viewer.

View Event Details

To view any event details window proceed as follows:

- Right-click on the event of interest
- Execute the Open command

The window shown below displays all available event information. Note that when the event is an acknowledged alarm (see Alarms section below), date and time of alarm acknowledgment is also shown, as well as user name of the user who acknowledged the alarm.

The *Source* button displays event source. When the button is pressed the Viewer displays the window (when available) associated with subsystem which generated the event.

Filter Events

To filter events click on any of the available filters on the left side of Event Viewer. Your system administrator can set up appropriate filters for viewing event log subsets.

Alternatively a search on any of the available event log columns can be made for a keyword or value of interest. See the User Interface section on how to search for a keyword.

Alarms

Alarms are events whose *EventLevel* property is tagged as ALARM. You can search for alarms by clicking on *Alarms* filter.

To acknowledge one alarm:

- Right-click on the alarm
- Execute *Acknowledge Alarm* command

SM records the date and time of alarm acknowledgment, as well as the user name of the user who acknowledged the alarm. This information can be viewed in Event Details window.

To acknowledge multiple alarms:

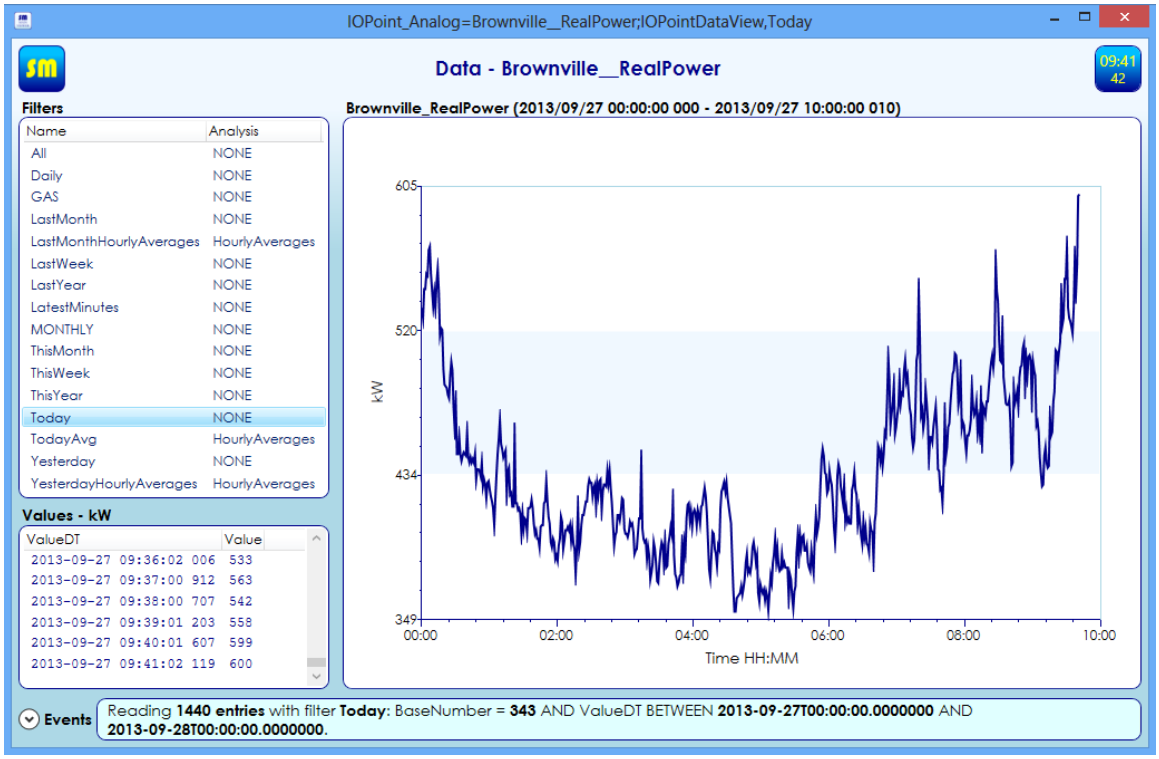
- Select multiple alarms
- Execute *Acknowledge Alarms* command

Alternatively, one can acknowledge multiple alarms as follows:

- (Optionally) Select Alarms filter
- Right-click on the Alarms filter
- Execute Acknowledge Alarms command

Data Viewer

Data Viewer – is used for real time data displays. It shows data in tabular and graphical forms in real time, and provides tools for sorting, filtering, exporting, and analysis of stored data, as well as real time data trending. The program is fully integrated into the Main Viewer, but can also be opened independently as a stand-alone program.



Startup and Shutdown

To start the integrated Data Viewer proceed as follows:

- Open I/O points window as described in the *Inputs and Outputs* section
- Right-click on I/O point of interest
- Execute *Data* command

Data Viewer opens displaying I/O point data in tabular and graphical forms.

To start the Data Viewer independently, click on the *Data Viewer* icon on Windows desktop, or execute the *Data Viewer* command in Windows *Start* menu. Data Viewer starts, displaying the list of available I/O points. Once I/O point is selected, I/O point data is displayed.

To shut down Data Viewer simply click on the *X* button at the top right of Data Viewer window.

Filter Data

To filter data click on any of the available filters on the left side of Data Viewer. Your system administrator can set up appropriate filters for viewing data subsets.

Export Data

To export data to a Microsoft Excel file proceed as follows:

- Open Data Viewer

- Right-click on to the display entitled *Values*
- Execute *Export to Excel...* command
- Specify file name and location

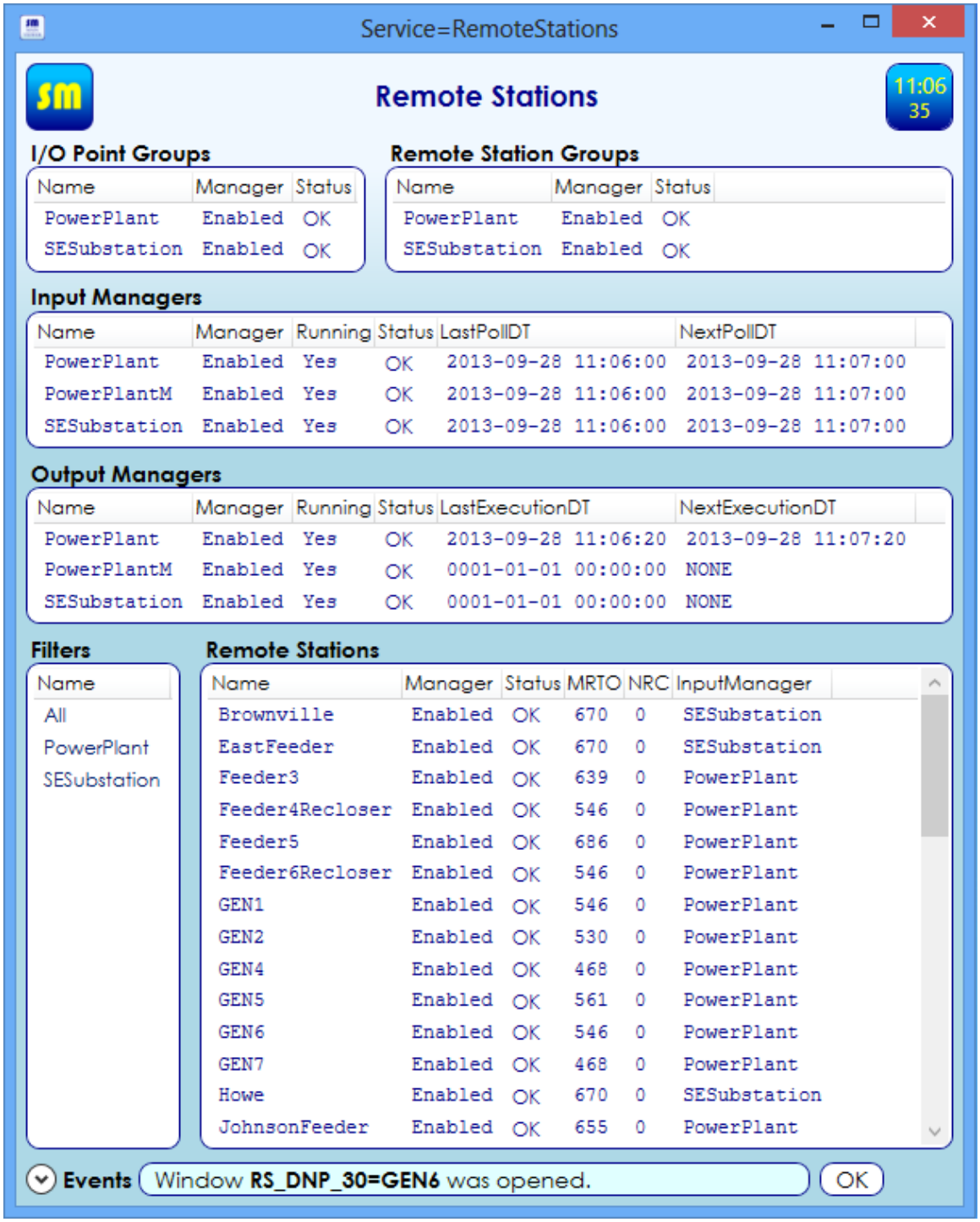
Delete Data Point

To delete a data point::

- Open Data Viewer
- Right-click on to the display entitled *Values*
- Execute the *Delete Data Point...* command

Remote Stations

RemoteStations service is responsible for management of devices integrated into monitored distribution system, such as substation IEDs (voltage regulators, reclosers, etc.), RTUs, meters (electric, water, gas, etc.), switches, etc.


Service=RemoteStations
Remote Stations
11:06
35
I/O Point Groups
Name Manager Status
PowerPlant Enabled OK
SESubstation Enabled OK
Remote Station Groups
Name Manager Status
PowerPlant Enabled OK
SESubstation Enabled OK
Input Managers
Name Manager Running Status LastPollDT NextPollDT
PowerPlant Enabled Yes OK 2013-09-28 11:06:00 2013-09-28 11:07:00
PowerPlantM Enabled Yes OK 2013-09-28 11:06:00 2013-09-28 11:07:00
SESubstation Enabled Yes OK 2013-09-28 11:06:00 2013-09-28 11:07:00
Output Managers
Name Manager Running Status LastExecutionDT NextExecutionDT
PowerPlant Enabled Yes OK 2013-09-28 11:06:20 2013-09-28 11:07:20
PowerPlantM Enabled Yes OK 0001-01-01 00:00:00 NONE
SESubstation Enabled Yes OK 0001-01-01 00:00:00 NONE
Filters
Name
All
PowerPlant
SESubstation
Remote Stations
Name Manager Status MRTO NRC InputManager
Brownville Enabled OK 670 0 SESubstation
EastFeeder Enabled OK 670 0 SESubstation
Feeder3 Enabled OK 639 0 PowerPlant
Feeder4Recloser Enabled OK 546 0 PowerPlant
Feeder5 Enabled OK 686 0 PowerPlant
Feeder6Recloser Enabled OK 546 0 PowerPlant
GEN1 Enabled OK 546 0 PowerPlant
GEN2 Enabled OK 530 0 PowerPlant
GEN4 Enabled OK 468 0 PowerPlant
GEN5 Enabled OK 561 0 PowerPlant
GEN6 Enabled OK 546 0 PowerPlant
GEN7 Enabled OK 468 0 PowerPlant
Howe Enabled OK 670 0 SESubstation
JohnsonFeeder Enabled OK 655 0 PowerPlant
Events
Window RS_DNP_30=GEN6 was opened.
OK

Monitor Remote Stations

To monitor *remote stations* (devices monitored in the field), proceed as follows:

- Open Main Viewer

- Open RemoteStations service window

To view a selected subset of remote stations click on one of the filters to the left of Remote Stations display. Your system administrator can set up appropriate filters for viewing remote station subsets.

Monitor Remote Station

To monitor a remote station:

- Open Main Viewer
- Open RemoteStations service window
- Right-click onto remote station of interest
- Execute *Open* command

The window not only displays remote station details, but also I/O points associated with that station.

Poll Remote Station

To issue a manual poll of remote station proceed as follows:

- Open Main Viewer
- Open RemoteStations service window
- Right-click onto remote station of interest
- Execute *Poll* command

Alternatively, in the window associated with remote station of interest proceed as follows:

- Right-click on the title part of the window
- Execute *Poll* command

Inputs and Outputs

In SmartMaster™, *inputs* are subsystems which manage data associated with corresponding data sources in the field (e.g. voltage readings, temperature readings, flow rates, etc.), and *outputs* are subsystems which manage data with corresponding data consumers in the field (e.g. controls, analog outputs). In SmartMaster™, the short name for inputs and outputs is *I/O points*.

Monitor I/O Point Values

To monitor I/O point values:

- Open Main Viewer
- Open RemoteStations service window
- Right-click on to window title
- Execute *I/O Points* command

To *view subsets* of I/O points either click on one of the filters on the left side of I/O points window, or open one of remote stations windows as described in a latter section. Your system administrator can set up appropriate filters for viewing I/O point subsets.

Control an Output

To issue a manual control command:

- Right click on control output
- Select Operate command
- Execute desired control operation

To manually operate a group of control outputs:

- Select outputs to be operated by clicking on outputs while holding down the *Ctrl* key
- Select Operate command
- Execute desired control operation

Some devices require a Select command to be issued before Operate command can be executed. In those cases proceed as follows:

- Right click on control output
- Execute Select command
- Right click on the same control output again
- Select Operate command
- Execute desired control operation

View I/O Point Data

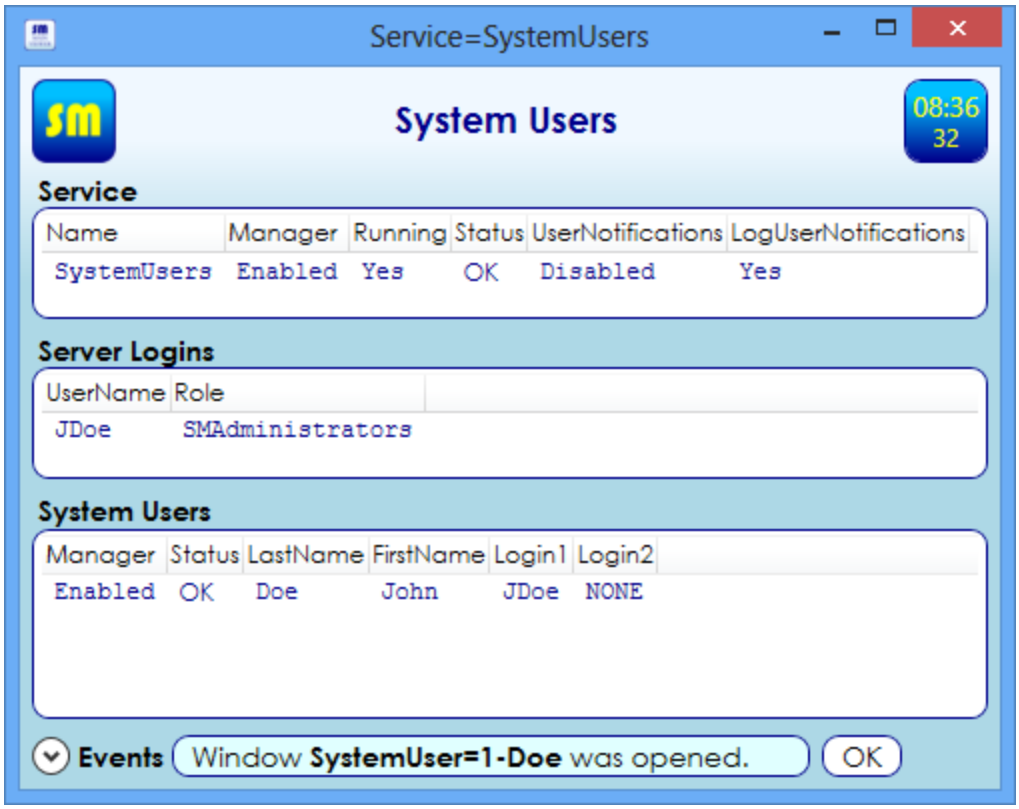
To view data associated with I/O point:

- Open I/O points window as described above
- Right-click on I/O point of interest
- Execute *Data* command

Data Viewer opens displaying I/O point data in tabular and graphical forms. Please consult the Data Viewer section for options and commands available in that program.

SystemUsers

This service is responsible for management of system user lists, user related security definitions, and assignment of important system event user notifications.



Display System Users List

To view the list of *system users* proceed as follows:

- Open Main Viewer
- Open SystemUsers service window

The users are listed in *System Users* display.

Display Server Logins

Server logins are credentials for signing on to SQL server. Each SmartMaster™ user must have at least one login. To view the list of available logins proceed as follows:

- Open Main Viewer
- Open SystemUsers service window

The logins are shown in the *Server Logins* display.

View System User I/O Points

To view the list of I/O points associated with a particular system user:

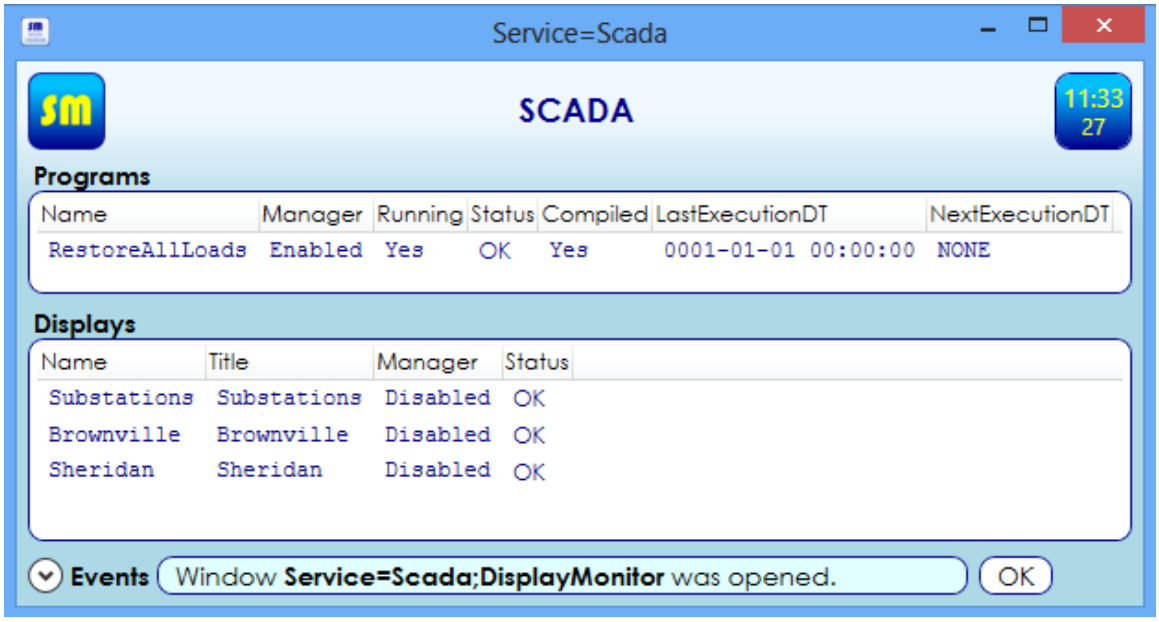
- Open Main Viewer

- Open SystemUsers service window
- Right-click on system user of interest
- Execute *Open* command

I/O points associated with selected user are listed in the *I/O Points* display.

SCADA

SCADA service is responsible for scheduling and execution of user authored programs, and management / display of one-line diagram displays.



List of programs

To view the list of programs available for execution:

- Start the Main Viewer
- Right-click on the SCADA service window
- Execute the *Open* command

Available user authored programs are listed in the display titled *Programs*.

Program Execution

Your administrator can create programs and schedule programs for periodic execution. To manually execute a user authored program proceed as follows:

- Open the SCADA service window
- Right-click on the program of interest
- Run the Execute Program... command
- Confirm program execution

Indications of successful program execution are two-fold:

- Execution confirmation in the event log
- Database modifications and system behavior dictated by the program

For example, if a program is to restore all load points (turn on power to all customers previously disconnected by the system), event log program execution confirmation is followed by control codes going out to all devices on customer sites restoring their power, followed by database updates documenting above actions.

List of One-Line Diagram Displays

To view the list of one-line diagram displays proceed as follows:

- Start the Main Viewer
- Right-click on the SCADA service window
- Execute the *Open* command

Available diagrams are listed under *Displays*.

Open a One-Line Diagram

To open a one-line diagram:

- Open the SCADA service window
- Right-click on the display of interest
- Execute the *Open* command

One-Line Diagram Commands

One-line diagrams are user authored. They consist of various display elements. Each display element (DE) is a part of the whole picture representing (part of) the monitored distribution system. Some of DEs are mapped on to I/O points so diagrams can be interactive. DEs mapped onto I/O points provide additional functionality:

- Their color changes when flown over by the mouse
- Their appearance may change based on the state of associated I/O point
- They expose commands which can be executed directly from one-line diagram display

For example, if a DE is mapped to a control output, DE exposes commands which enable the user to manually operate that control output.

To operate commands exposed by a display element proceed as follows:

- Open one-line diagram display of interest
- Right-click on the DE of interest
- Execute command of interest

Available commands depend on the type of associated I/O point. All commands are self-documented as described in the *User Interface* section.

Report Manager

Report manager is a web based program for accessing and management of reports. It can be started by executing Main Viewer *Reports* command, as described above. It can also be opened via a web browser, by going to

http://<server name>/Reports_SmartMaster

Above, <server name> is the name of your server. Only *Internet Explorer* and *Firefox* browsers can be used at this time.

To execute and display a report:

- Click on the folder where report is stored
- Double-click on the report of interest